Immersive Assessment—Can online assessment be made personal?

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Abstract

Assessment is often thought of as being "on the edge of the learning world". Too often it is the after thought rather than the first thought. Let's reposition assessment, pulling it back from the edge and making it central to learning. Social media and web technologies make it possible to structure activities where the task and process of learning link assessment and learning goals. Timely feedback provided by students as well as lecturers becomes the teaching process. Choice of technologies and learning strategies relate directly to the integrated assessment task and the learner initiated identification of tasks and sub-tasks to complete the assignment. Immersive assessment is personal in that the learner engages with real-world problems associated with their own context, taking on the role of problem-solver from their own unique perspective. This paper argues for authentic teaching through assessment, where learners are encouraged to wrangle with complex situations engaging fully with their metacognitive processes.

Keywords: authentic assessment, online learning, distance education, metacognitive process

Introduction

The first question students ask on the first day of their new course is *"What are the assignments?"* Many students begin their studies by checking out what is expected in their assessment and the marking strategies used. They then plan their study accordingly (if they plan at all!). While assessment is a first- thought for students, much too often assessment is a final thought for the lecturer who sets up the course. Most lecturers seem to concentrate on what they want to tell the students and what material they want the students to read, either as textbook or journal articles, rather than planning from the perspective of how the student applies their knowledge in practice. In this paper, I argue for a more considered approach that is learner-centred, recognising that it is how we transfer our learning into practice that demonstrates knowledge. The approach is based on neuroeducation and the links between mind, brain and education science, and the metacognitive process identified by James Zull (2011). The approach also extends the concepts of authentic assessment (Cumming & Maxwell, 1999; Herrington & Herrington, 1998; Tombari & Borich, 1999) to creating immersive personal assessments in an online learning environment. I highlight a variety of strategies used in a range of subject areas for 'personalising' technology-based assessment by developing the practice of 'teaching through assessment' (TTA) as proposed by Suzy Edwards (2012). If learning designers follow the oft quoted saying 'begin with the end in mind' the learning goal and the assessment would be one and the same. Yet, my experience has been that seldom does the measurement of the result of learning (assessment item) equate to the goal for learning (objective or outcome statement).

Immersive assessment

Quite often the terms immersion and involvement are used interchangeably. Let's investigate the difference between them. When people are *involved*, they are directing their attention and energy towards a set of meaningfully related activities or events. By attending to the activity, they may still distance themselves from it, as if they were watching from the sidelines. Similar to a spectator watching a football game either in person or on the television. This person could be shouting

directions to the team, rooting for their favorite player, or cursing the referee for a bad call, yet in each of these situations, they are still a spectator however emotionally involved they become.

On the other hand, *immersion* shortens the personal distance so that immersed persons no longer see themselves as being outside the activity or event. Being immersed means that they are playing the game, not watching it. They are running down the field, dodging opponents, and ultimately scoring the goal. As immersed participants, they imagine or visualise themselves within the context as players rather than as spectators, experiencing the same physical, emotional, chemical and metacognitive changes. Becoming immersed in the situation causes the body to bring previous memories into consciousness, adding new data to these and creating new and present-time concepts. In an immersive learning situation, the person does not come out of the situation thinking about the response, but *knows* the best way to respond in a similar situation because the new information has replaced the old within the mind. While it is still quite early days in neuroscience research and the understanding of how human biology and chemistry relate to human learning, some findings have indicated a formative role between emotions and cognition (Innordion-Yang & Faeth, 2010; Zull, 2011). "Building academic knowledge involves integrating emotion and cognition in social context" (Innordion-Yang & Faeth, 2010, p. 69), providing sufficient opportunities to test and retry alternative actions toward a goal.

Emotion plays a critical role in our learning. Positive emotion provides the intrinsic rewards that foster motivation and long-term retention. Memories are very personal events. None of us have the same memories, even of the same event. Zull (2011) describes these thought patterns as *remembering forward*—imagining the future depends on using memories from the past. By being immersed, rather than involved we use not only all our senses and emotions but engage fully our cognitive process, in an iterative trial and error feedback loop. When cognition, emotion, action, feelings, sensory and motor experience are interacting—the mind is not just reviewing information, but gaining real knowledge by building many neuronal connections and strengthening recall of previous learning, with new learning.

Impact of an immersive environment

How can immersive assessment be organised to benefit from the joys of learning? What tools and tasks might foster a joyful learning and assessment environment? By engaging immersively, learners may experience the consequences of their actions and thus reassess what further actions need to be taken as they progress along an iterative learning pathway. In such a situation, learning may be conscious or non-conscious (Innordion-Yang & Faeth, 2010). In an immersive learning simulation the mind produces results as if it were in the real world. In the holistic simulation situation, the learner's experience facilitates the growth of synaptic networks *changing sensory experience into action experience* (Zull, p.29). How *real* does an immersive learning experience need to be to release the emotive chemicals that create a transformative and transferrable learning experience?

I watched as my sons have become immersed in their role-play card games. I have found it enlightening to observe them discuss the game process and outcomes hours later, using the first-person 'I' to talk about the excitement and how they felt and what they did within the game situation. I have also listened as they described how their friends have responded within role—discussing the traits, activities, and emotional responses of these friends when the turn of events either supported, or went against their friend's character desires. At these times, I have wondered what they were learning and how it changes what they know. When asked for an example of learning that has resulted from his roleplaying, one explained, "I am a noble knight on the search for fame and glory. I base him loosely off of myself having similar features and beliefs. I did this to make game play easier for myself because those decisions that my character made would reflect myself and how I would deal with the situations if it were really me. But I do say loosely because I've no true understanding of what I would do if I was faced with a Demon or Troll for example. My knight's relationship with his horse influenced how I now think about my own horse. I am a Knight and my horse is everything to me—my mode of transport and my closest companion within the game. The horse was another character from

the very beginning of the game. His name is 'Storm" and has a history to everyone in the group game. He is just another one of the group. In some cases he is more respected then new members when they come into the group. Through this relationship that my character had with his horse I started to question my own true relationship with my real horse, Sasha. I started to realise I was a bad owner, not taking good care of her and treating her like a... toy would be the best description. I started to groom her more often. I got regular vet checks and started looking after her health and particularly her feet. I now ride her a 100 times more than I have over the past couple of years."

Being immersed has a transformative quality. I came to speculate on the process of an immersive environment where assessment is participation and action, when I participated as a player in SimuLearn's Virtual Leader (Aldrich, 2004). Within this online simulation program, I came to observe myself making 'automatic' responses which did not result in a good outcome. I became frustrated and soon noted how my emotional response fostered a physical reaction and choices within the simulation. I found that I needed to take note of my responses, reflect on them and try other actions. I related the scenarios in the online simulation with similar circumstances I had experienced in the past, during work and social settings. In order to correct my responses, I found that I needed to engage a metacognitive process of testing, reflecting, venturing a new action, and observing in order to learn from the situations. I also found that I had immersed myself in the situation, as it was necessary to take control of some emotional responses that were triggered by the online scenarios. As I had the opportunity to test, reflect, and try again, I found that I was able to refine my approaches to conflict resolution and become more adept at 'reading' the situation. I also found that my 'natural' reaction to the simulation conditions became more suitable and less emotionally overpowering. The assessment for this program was not a right or wrong test, but a statement of what was done and what the result of the action was—a contextualised feedback loop. Ultimately, I was the judge as to the right or wrongness of the action and result. I was the judge of whether I was 'progressing' in my ability to handle a range of communication challenges in an employment situation.

The metacognitive process

Knowledge creation (learning) is a complex interaction of factors, which Zull (2011) describes as a metacognitive process. The metacognitive process as outlined by Zull (random action → discovery → joy→ intentional action → integration → images → symbol → forming memories → predicting → experiential change) is a pattern creating process. The human brain makes sense of life by finding patterns and order (Caine, Caine, & Crowell, 1999). It categorizes, finding similarities and differences and comparing and isolating features. In order to conduct this patterning activity, the human brain must have situations to test, to compare, and to resolve. "Learning is required when an entrenched pattern is challenged or disrupted and new answers are needed" (p. 30). Personal reflection based on practical experience is an important step in the metacognitive process, which enables the continuous reorganisation of information within the individual mind. The mysterious process of changing data (experience) into new knowledge is still unexplained (Zull, 2011). While we know the brain goes through a series of actions— experiencing, discovering, feeling, reasoning, and decision-making; we do not know precisely how it all comes together. Yet, we do know that the brain requires immersive information to build richly integrated neuronal networks. Learning impacted by emotions is often unconscious learning—"learners' emotional reactions to the outcomes of their behavioral choices become implicitly attached to the cognitive knowledge about the domain" (Innordion-Yang & Faeth, 2010, p. 75). The metacognitive process is driven by motivation and interest related to the emotional immersion of the learner. Emotion and cognition interact, energize and shape each other. Thus, the demonstration of knowledge (assessment) is necessarily a very personal activity.

The immersive environments were not 'real'. In some instances, the boys played with no other resources than cards (as in Magic); or with styrophone scenery and lead models. Yet the immersive environment they constructed was enough to convey a 'learning reality' for some of them, while other plays were merely 'involved' in the game and reported 'learning' little that they would apply to other situations. I would suggest that the immersion for one son was directly related to the emotional attachment with the knight and his horse, replicating how he was 'attached' to his own horse. It was

the ‘remembering forward’ process in the brain-mind interaction identified by Zull (2011). The immersive process within a role-play card game fostered emotional engagement and sparked the metacognitive feedback loops creating my son’s desire to ensure that he cared for his real-world horse more effectively. For me, the immersive simulation made me realise that I needed to step-back from many communication situations and take a more contextual and considered approach that focused on the personality of the person with whom I was attempting to communicate rather than focus on the topic under discussion or task completion.

Personalising authentic assessment

Assessment has been a hot topic for several decades. At one time, assessment theory and practice was thought to be moving away from the narrowly focused psychological concepts of testing and measurement (Cumming & Maxwell, 1999). Yet, we are still plagued with national standards, and a one size fits all perspective of setting academic assignments. In a national science curriculum project Clarke-Midura, Dede, & Norton (2011) investigated why only 29 percent of students in the U.S. demonstrated ability to complete higher-order tasks such as those involving scientific explanations. Based on advances in (1) cognitive science, (2) measurement, and (3) information and communication technologies the research team implemented immersive virtual environments (IVE) to engage learners. “ IVEs are three-dimensional (3-D) environments, either single or multi-user, where participants’ digital personae (avators) engage in viral activities and experiences” (Clarke-Midura, et al., 2011, p. 30). Yet, to measure the outcomes in these environments, the researchers used ‘after-the experience’ paper and pencil item- based assessments to measure student learning. After a decade of research in the use of immersive virtual environments (IVE) the team found that these “paper and pencil item-based assessments …do not fully capture students’ learning …” (p.30). The results of this research directed the researchers towards the development of strategies for recording student performance captured as ‘in-world’ interactions. The interactions result from personal choices made during engagement in the IVE, and are not reliant on single right answer measurement. Students’ scores are based on the evidence and reasoning they provide for a given claim, and are part of the learning feedback loop when delivered via the aid of digital technologies. The importance of the feedback loop within the metacognitive process should not be trivialized. Making an assessment personal and immersive depends on the learner’s response and adjustment to stimuli.

Outcomes from an international research project evaluating the authenticity of 20 online courses found that assessment and collaboration were the two weakest elements (Teras, Leppisaari, Myllyla, & Vainio, 2012). ‘Authentic online education refers to learning in environments that provide learners with opportunities to exercise realistic work practices, methods and cognitive processes in authentic situations, and to make use of authentic sources and materials’ (p. 2411). More importantly however, is the necessity to be engaged in a metacognitive feedback loop that has consequences of personal action and reaction. Motivation is a key aspect and needs to be sustained through feedback responses, reflection and active involvement (de Freitas, 2006).

Immersing assessment as a personalised learning task

In formal learning environments, assessment is the main driver for students, and therefore, should be the main focus of the learning process. The problem arises when lecturers consider the assessment tasks as the final task of learning (and often unconnected) rather than the learning process itself. Susie Edwards suggests a strategy she labels as ‘teaching through assessment’ (tta) where ‘technology and assessment are converged and used to create meaningful contexts for learning and teaching’ (2012, p. 2). A desired outcome is for students to construct their new memories *within* their social and professional life rather than just referring to these ideas *as possible* actions they might use at some time in future. Learning through assessment emphasizes a process of making learning concrete and transferrable. Immersive assessment becomes the learning activity with personalised learner goals, rather than the trial and execution related to a goal set by another. When students determine their own assessment item within the general guidelines directed towards the learning goal,

they will personalise the activity to meet their specific learning needs.

(Herrington, Reeves, & Oliver, 2006) highlight the synergistic nature of aligning learner, task, and technology within an authentic distance learning environment. As with Edward's 'tta' strategy, the emphasis is on the design of authentic tasks that allow students to come up with "competing solutions and a diversity of outcomes. [Such] tasks allow a range and diversity of outcomes open to multiple solutions of an original nature, rather than a single correct response obtained by the application of rules and procedures" (p.237).

Technology based strategies for teaching through assessment

Roleplay is one strategy used to immerse students in the personal context. Personalising that involvement to make it immersive requires a shift in emphasis. Stewart & Edwards (2012) describe online roleplay engaging learners in a conflict resolution task. By taking on a chosen role in a conflict scenario, students are able to personalise as they work through a resolution process. The task—resolving conflict with colleagues or clients in a day care centre—requires students to step into a role with which they are familiar, yet within a situation where they may engage with difficult concepts from a new perspective. They not only take on a role, but must also step back and reflect on their actions and those of others in the scenario. They create the script by attempting to resolve the conflict using online synchronous or asynchronous technologies (e.g. virtual classroom, chat, Skype, discussion board, or a group wiki). The script evolves according to previous personal experiences of the players. Once the first attempt at resolving the conflict is completed, the players step out of role and analyse the resolution script and process—Was it successful? How could the process have been done differently? —With this new knowledge, the students engage in a series of feedback loops, and another attempt at resolving the conflict.

The assessment for these learners is the learning activity itself. They are asked to reflect on what they have learned and how it might play out again. This type of activity uses assessment as a metacognitive tool to build professional skills of perceiving, patterning, abstracting, embodied thinking, modeling, experimentation (play) and synthesizing. By being immersed in the role-play on a personal level; by creating the script from their own experiences, they become emotionally committed. Yet, the additional activity of focused attention and engaging peripheral perception as they collaborate to symbolise the event (via creating mindmaps) and suggest other possible ways to play out the scenario (strategies for resolving issues), these learners are building their repertoire for future situations which require them to make decisions or assist others to make decisions.

Another example of personalised assessment has been practiced in a Bachelor of Nursing program (Wilson, September 2010). A lecturer of mental health care assigned students to participate with a partner in two scenarios. In each scenario the students were asked to take on the role of nurse or patient, swapping roles for the second scenario. Students had access to a variety of resources available through the LMS 'resource library' including 'tools of the trade' which might be useful to the nurse in dealing with the patient; or to the patient in determining how they would respond under these health conditions. The wiki-based case situation was designed to replicate and simulate the real experience of providing and receiving nursing care in a mental health context. Web technologies provide an opportunity for these undergraduate student nurses to work collaboratively with their peers, and to undertake simulated clinical skills development within a safe virtual environment. As a nursing practitioner in the virtual environment students planned and implemented nursing interventions and nursing management of a mental health problem without the risk of harm to real clients. The process of analysing the client situation (from both the point of view of the nurse eliciting information from the patient, and determining what symptoms to display when taking on the patient role) personalised the process of finding and reporting critical data to the situation. The process became immersive as students became involved in the communication process of giving and receiving feedback as they would in a clinical situation.

In this example, the wiki tool was selected because it was well suited to flexible and asynchronous collaborative online work for the distance education students. Within the wiki, students built individualized mental health nursing care plans which include MH-OAT assessment tools, evidence-based nursing intervention selection and their virtual implementation, and, virtual medication administration management. This learning activity culminated in the final submission of an assessable portfolio (virtual client record) reporting on the comprehensive mental health care provided to and received by the client. In many of the cases, the portfolio included personalised letters describing the care given or received and the emotional response from the nurse or patient's perspective.

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Some authors have practiced and written about authentic immersive learning promoting the advantages for 21st Century distance education. Herrington, Reeves, and Oliver (2007) emphasise the need to employ cognitive realism rather than physical realism. Cognitive realism allows the brain to access prior learner memories and heightens the learner's motivation and interest. Cram, Hedberg, and Gosper (2011) identify the synergistic design capabilities of computer-based simulation, which can combine exploratory environments with role play and design and construction approaches. Authentic internship or apprenticeship situations can also be provided to replace workplace sites that have become increasingly more unattainable as student numbers increase (Dede, 2012).

Conclusion

As a learning designer, the lecturer should be asking the assessment question as a first step in the curriculum planning process. When framing these thoughts— 'What assignments am I going to set for

this class?', it would be metacognitively useful for students, if course designers considered immersive and effective technology-enabled assessment strategies. Ask the questions: "How can an assignment be personalised by the student? Is this assignment constructed to incorporate natural feedback loops? In the process of creating a 'personalised' assignment, care must be taken not to 'camouflage' an assessment to make it appear authentic. Creating an immersive task and directing the learner's attention to knowledge formation through the construct of the assessment activity is a means of personalising it. That is, construct the task so that each student may shape the learning to his or her own circumstances and needs. Planning for regular and timely feedback loops that add fuel to the metacognitive process will make learning more effective and efficient, and thus more permanent.

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